

Introduction

Japanese Society of Chemotherapy (JSC) conducted the third nationwide surveillance of bacterial respiratory pathogens in 2008. We compared the JSC data of respiratory pathogens for past three years.

Materials & Methods

- 1) Surveillance period : January – August, 2008.
- 2) Cooperative institutes : 33 Hospitals throughout Japan.
- 3) Strains tested : Isolates obtained from sputum, specimens by trans-tracheal aspiration (TTA) and/or bronchoscopy (confirmed by qualitative culture, by Gram-staining etc.) of well-defined adult respiratory tract infection (RTI) patients [community-acquired pneumonia (CAP), hospital-acquired pneumonia (HAP), acute exacerbations of chronic respiratory diseases (AECRD), and others].
- 4) Antibacterial agents tested : 44 agents as listed in Table. 2.
- 5) Susceptibility test : Conducted at the central laboratory (Kitasato University, Anti-infection Drugs Research Center) according to CLSI standards for broth micro dilution methods.
- 6) For classification of penicillin susceptibility in *Streptococcus pneumoniae*, M-100 S-17 (January, 2007) was employed.
- 7) Determination of β -lactamase Nitrocefin method and Cica-Beta Test [Kanto Chemicals, Tokyo ; for detection of extended-spectrum β -lactamase (ESBL) and metallo- β -lactamase (MBL)].

Table.1 Bacterial Strains

	<i>Staphylococcus aureus</i>	<i>Streptococcus pneumoniae</i>	<i>Streptococcus pyogenes</i>	<i>Moraxella catarrhalis</i>	<i>Haemophilus influenzae</i>	<i>Klebsiella pneumoniae</i>	<i>Pseudomonas aeruginosa</i>	Total
Numbers collected	197	260	7	111	220	130	172	1097
Numbers Tests	189	211	6	106	187	126	162	987

Fig.1 Proportions of *S. aureus*, *S. pneumoniae* and *H. influenzae* under stratifications for past three years

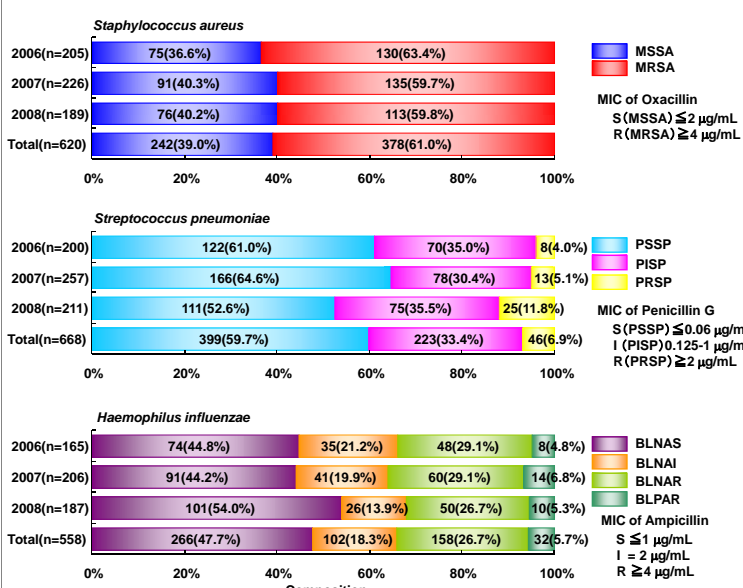
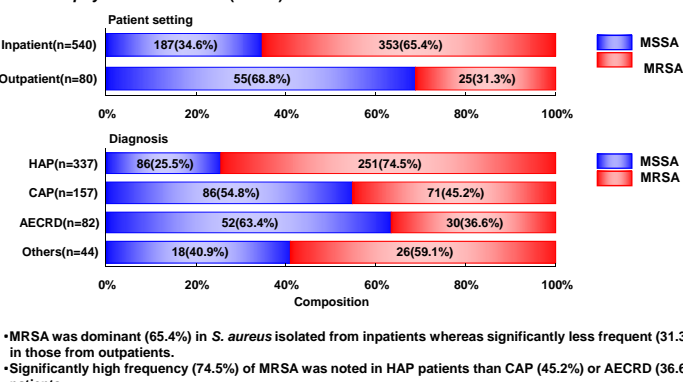
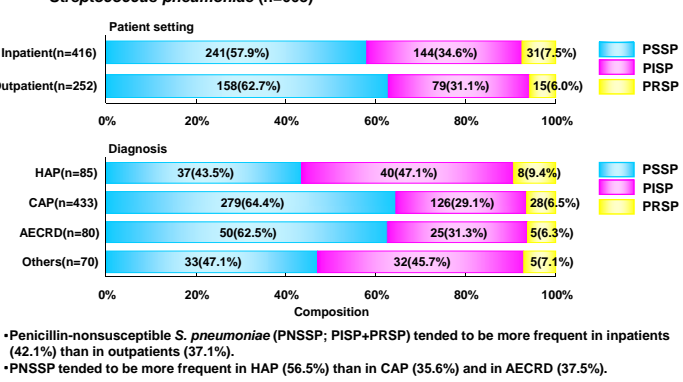


Fig.2 Proportions of MRSA under stratifications for past three years *Staphylococcus aureus* (n=620)



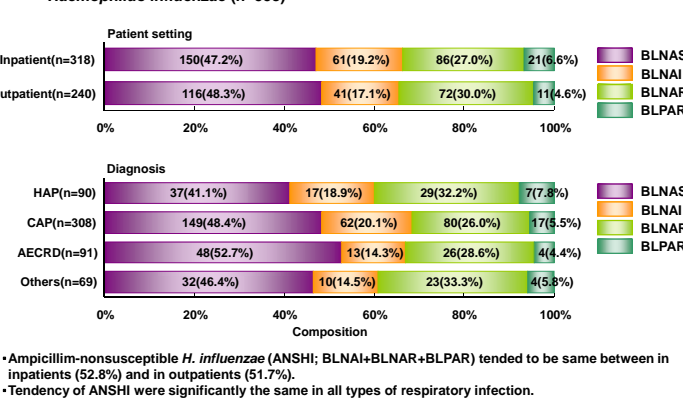
• MRSA was dominant (65.4%) in *S. aureus* isolated from inpatients whereas significantly less frequent (31.3%) in those from outpatients.
• Significantly high frequency (74.5%) of MRSA was noted in HAP patients than CAP (45.2%) or AECRD (36.6%) patients.

Fig.3 Proportions of PISP and PRSP under stratifications for past three years *Streptococcus pneumoniae* (n=668)



• Penicillin-nonsusceptible *S. pneumoniae* (PNSSP; PISP+PRSP) tended to be more frequent in inpatients (42.1%) than in outpatients (37.1%).
• PNSSP tended to be more frequent in HAP (56.5%) than in CAP (35.6%) and in AECRD (37.5%).

Fig.4 Proportions of BLNAI, BLNAR and BLPAR under stratifications for past three years *Haemophilus influenzae* (n=558)



• Ampicillin-nonsusceptible *H. influenzae* (ANSH; BLNAI+BLNAR+BLPAR) tended to be same between in inpatients (52.8%) and in outpatients (51.7%).
• Tendency of ANSH were significantly the same in all types of respiratory infection.

Table.2 Susceptibility of 3 major respiratory pathogens to antibacterial agents for past three years

antibacterial agent	<i>Staphylococcus aureus</i> (n=620)			<i>Streptococcus pneumoniae</i> (n=668)			<i>Haemophilus influenzae</i> (n=558)		
	MIC range	MIC ₅₀	MIC ₉₀	MIC range	MIC ₅₀	MIC ₉₀	MIC range	MIC ₅₀	MIC ₉₀
Penicillin G	≤ 0.06 - 128	16	32	≤ 0.06 - 4	≤ 0.06	1	≤ 0.06 - ≥ 256	2	8
Ampicillin	0.125 - 128	16	64	≤ 0.06 - 8	0.125	2	0.125 - ≥ 256	2	8
Ampicillin/Sulbactam	0.125 - 64	8	32	≤ 0.06 - 8	0.125	2	≤ 0.06 - 16	2	8
Amoxicillin/Clavulanate	0.125 - ≥ 128	16	32	≤ 0.06 - 8	≤ 0.06	1	0.125 - 32	2	8
Piperacillin	0.5 - ≥ 256	64	≥ 256	≤ 0.06 - 8	≤ 0.06	2	≤ 0.06 - ≥ 256	≤ 0.06	0.25
Piperacillin/Tazobactam	0.25 - ≥ 256	64	128	≤ 0.06 - 4	≤ 0.06	2	≤ 0.06 - 1	≤ 0.06	0.125
Cefaclor	0.5 - ≥ 256	128	≥ 256	≤ 0.06 - ≥ 256	1	32	0.125 - 128	8	32
Cefdinir	≤ 0.06 - ≥ 128	64	≥ 128	≤ 0.06 - 16	0.25	4	≤ 0.06 0 ≥ 256	1	8
Cefcapene	0.25 - ≥ 256	≥ 256	≥ 256	≤ 0.06 - 16	0.25	0.5	≤ 0.06 - 8	0.25	2
Cefditoren	0.25 - ≥ 128	64	≥ 128	≤ 0.06 - 8	0.125	0.5	≤ 0.06 - 2	≤ 0.06	0.25
Cefazolin	0.25 - ≥ 256	128	≥ 256	≤ 0.06 - 8	0.25	2	0.25 - ≥ 256	8	128
Cefotiam	0.25 - ≥ 256	64	≥ 256	≤ 0.06 - 16	0.25	4	0.25 - 128	4	64
Ceftazidime	4 - ≥ 128	≥ 128	≥ 128	≤ 0.06 - 64	4	8	≤ 0.06 - 8	0.125	0.5
Ceftriaxone	2 - ≥ 256	≥ 256	≥ 256	≤ 0.06 - 8	0.25	1	≤ 0.06 - 1	≤ 0.06	0.25
Cefepime	0.5 - ≥ 256	64	≥ 256	≤ 0.06 - 8	0.25	1	≤ 0.06 - 16	0.5	2
Cefozopran	0.25 - ≥ 256	16	64	≤ 0.06 - 8	0.25	1	≤ 0.06 - ≥ 256	4	8
Cefmetazole	0.5 - 128	16	64	≤ 0.06 - 32	0.5	8	0.5 - 128	4	16
Aztreonam							≤ 0.06 - 16	0.25	2
Imipenem	≤ 0.06 - ≥ 128	16	64	≤ 0.06 - 2	≤ 0.06	0.25	≤ 0.06 - 32	1	4
Panipenem	≤ 0.06 - ≥ 256	8	32	≤ 0.06 - 1	≤ 0.06	0.125	≤ 0.06 - 16	0.5	2
Meropenem	≤ 0.06 - 128	8	32	≤ 0.06 - 2	≤ 0.06	0.25	≤ 0.06 - 2	≤ 0.06	0.5
Biapenem	≤ 0.06 - 128	16	64	≤ 0.06 - 2	≤ 0.06	0.25	≤ 0.06 - 32	2	8
Doripenem	≤ 0.06 - 64	4	16	≤ 0.06 - 1	≤ 0.06	0.25	≤ 0.06 - 4	0.125	1
Faropenem*	≤ 0.06 - ≥ 256	64	≥ 256	≤ 0.06 - 1	0.125	0.25	0.125 - 8	1	4
Gentamicin	0.125 - ≥ 256	0.5	128	0.5 - 32	8	8	≤ 0.06 - 4	1	2
Amikacin	1 - ≥ 256	8	32	0.5 - 128	32	64	0.25 - 16	4	8
Arbekacin	0.25 - 8	0.5	2	0.25 - 64	16	32	0.25 - 16	4	4
Ciprofloxacin	≤ 0.06 - ≥ 256	16	128	≤ 0.06 - 64	1	2	≤ 0.06 - 16	≤ 0.06	≤ 0.06
Levofloxacin	≤ 0.06 - ≥ 256	8	≥ 256	≤ 0.06 - 64	1	2	≤ 0.06 - 8	≤ 0.06	≤ 0.06
Tosufloxacin	≤ 0.06 - ≥ 32	4	≥ 32	≤ 0.06 - ≥ 32	0.125	0.25	≤ 0.06 - ≥ 32	≤ 0.06	≤ 0.06
Gatifloxacin	≤ 0.06 - ≥ 256	2	64	≤ 0.06 - 16	0.25	0.5	≤ 0.06 - 8	≤ 0.06	≤ 0.06
Pazufloxacin	0.125 - ≥ 256	1	≥ 256	≤ 0.06 - 128	2	4	≤ 0.06 - 32	≤ 0.06	≤ 0.06
Moxifloxacin*	≤ 0.06 - 64	2	32	≤ 0.06 - 8	0.25	0.5	≤ 0.06 - 8	≤ 0.06	≤ 0.06
Minocycline	≤ 0.06 - 32	0.25	16	≤ 0.06 - 64	4	16	0.125 - 8	0.25	1
Erythromycin	0.125 - ≥ 256	≥ 256	≥ 256	≤ 0.06 - ≥ 256	≥ 256	≥ 256	0.25 - 32	4	8
Clarithromycin	0.125 - ≥ 128	≥ 128	≥ 128	≤ 0.06 - ≥ 128	≥ 128	≥ 128	0.5 - 64	8	16
Azithromycin	0.25 - ≥ 128	≥ 128	≥ 128	≤ 0.06 - ≥ 128	≥ 128	≥ 128	≤ 0.06 - 4	0.5	1
Tellithromycin	≤ 0.06 - ≥ 64	≥ 64	≥ 64	≤ 0.06 - 4	≤ 0.06	0.25	≤ 0.06 - 8	2	4
Clindamycin	≤ 0.06 - ≥ 256	≥ 256	≥ 256	≤ 0.06 - ≥ 256	32	≥ 256	≤ 0.06 - 128	8	16
Vancocycin**	0.5 - 2	1	2	≤ 0.06 - 0.5	0.25	0.5			
Teicoplanin	0.125 - 4	1	1						
Linezolid**	1 - 8	2	2	≤ 0.06 - 2	0.5	1			
Oxacillin	≤ 0.06 - ≥ 256	128	≥ 256						
Cefoxitin	2 - ≥ 256	64	≥ 256						

* : *S. aureus* 415 strains, *S. pneumoniae* 468 strains, *H. influenzae* 393 strains
** : *S. pneumoniae* 468 strains

Conclusion and Discussion:

- Nationwide surveillance of bacterial pathogens in adult respiratory tract infections showed the following tendency.
- MRSA infection was significantly high among inpatients with HAP. It was noticeable that MRSA infection was as high as that of outpatients.
- Frequency of penicillin-nonsusceptible *S. pneumoniae* was 30 – 50%, irrespective of stratifications of patients.
- Ampicillin-nonsusceptible *H. influenzae* were significantly high in all types of respiratory infection in Japan.